D E C L A R A T I O N

I, Takao Ochi, a Japanese Patent Attorney registered No. 10145, of Okabe International Patent Office at No. 602, Fuji Bldg., 2-3, Marunouchi 3-chome, Chiyoda-ku, Tokyo, Japan, hereby declare that I have a thorough knowledge of Japanese and English languages, and that the attached pages contain a correct translation into English of the priority documents of Japanese Patent Application No. 6-336063 filed on December 22, 1994 in the name of CANON KABUSHIKI KAISHA.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made, are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

signed this 14th day of January, 1999

Takao Ochi

TAKAO OCHI

PATENT OFFICE

JAPANESE GOVERNMENT

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[Title of the Invention] OBSERVATION OPTICAL DEVICE

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[Inventor]

[Domicile or Residence] c/o Canon Kabushiki Kaisha
30-2, 3-chome, Shimomaruko, Ohta-ku, Tokyo

[Name] TAKESHI NISHIMURA

[Domicile or Residence] c/o Canon Kabushiki Kaisha
30-2, 3-chome, Shimomaruko, Ohta-ku, Tokyo

[Name] SHOICHI YAMAZAKI

[Applicant]

[Identification No.] 000001007

[Name] CANON KABUSHIKI KAISHA

[Representative] HAJIME MITARAI

[Attorney]

[Identification No.] 100086818

[Patent Attorney]

[Name] SACHIO TAKANASHI

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[Material]	Drawings	1
[Material]	Abstract	1

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[Name of the Document] Specification

[Title of the Invention] Observation Optical Device

[What is claimed is:]

[Claim 1]

An observation optical device having display means for displaying an image on a display face, an image observation optical system for forming a virtual image of said image in front of the observer, and visual line detecting means for detecting visual line information of said observer, characterized in that:

the size and the position of portion in which said image is displayed on the display face are controlled on the basis of the visual line information of said observer detected by said visual line detecting means.

[Claim 2]

An observation optical device having display means for displaying an image on a display face, an image observation optical system for forming a virtual image of said image in an external scenery in front of the observer, and visual line detecting means for detecting visual line information of said observer, characterized in that:

the size and the position of a portion in which said image is displayed on the display face are controlled on the basis of the visual line information

of said observer detected by said visual line detecting means.

[Claim 3]

An observation optical device according to claim 2, wherein a portion of said external scenery overlapped with the virtual image of said image is shielded by a shielding member.

[Claim 4]

An observation optical device according to claim 1, 2 or 3, further comprising discrimination means for judging whether or not the visual line of said observer is fixed for a given period and substantially in a given direction.

[Claim 5]

An image observation device characterized in that, when image information displayed on a display face of the display means is formed to be observed as a virtual image in front of the eye of the observer by the image observation optical system, a displayed state of the image information displayed on said display face is controlled by control means on the basis of visual line information of the observer obtained by visual line detecting means provided in front of the eye of said observer.

[Claim 6]

An image observation device according to claim 5, wherein the displayed state of said image information indicates the size and/or the displayed position of said image information.

[Claim 7]

An image observation device characterized in that, when image information displayed on a display face of display means is formed as a virtual image to spatially overlap with an external image in front of the eye of the observer by an observation optical system and the both images are observed in the same observing view, a displayed state of the image information displayed on said display face is controlled by control means on the basis of visual line information of the observer obtained by the visual line detecting means provided in front of the eye of said observer.

[Claim 8]

An image observation device according to claim 7, wherein said control means causes a shielding member to shield a light beam from an external image corresponding to an area in which the virtual image of the image information displayed on the display face and the external image spatially overlap with each other so that the light beam does not enter the eye of the observer.

[Detailed description of the Invention]

[0001]

[Field of the Industrial Utilization]

The present invention relates to an observation optical device, and particularly, to an observation optical device which is suitable for a helmet-type display device or a spectacle-type display device to be mounted on the head of the observer so as to observe an image of a character or a picture displayed on display means as an enlarged virtual image, or to spatially overlap the virtual image with an external image so as to observe the both images in a single observing view.

[0002]

[Prior Art]

Conventionally, observation optical devices of various kinds have been proposed which can be mounted on the head of the observer so as to enlarge an image of a character or a picture displayed on display means to be observed. Some of them are capable of varying a seeming size (observation angle of view) of an image to be observed, thereby attaining easier handing of the device.

[0003]

For example, in Japanese Patent Laid-Open Application No. 6-38144, there is disclosed an

observation optical device which is provided with means for varying an observation angle of view so as to make the observation angle of view to be variable at the will of the observer.

[0004]

Fig. 7 is a view showing the constitution of the observation optical device disclosed in the above-mentioned application. In Fig. 7, reference numeral 101 denotes the observer, 102 the eye of the observer, 103 a display element for a two-dimensional image, 104 an eyepiece optical system of a large angle of view, which is normally retracted outside an optical path, and 105 an eyepiece optical system for a normal angle of view.

[0005]

An operation of this observation optical device will be described. The observer 101 normally observers an image displayed in the display element 103 for a two-dimensional image by using the eyepiece optical system 105 for a normal angle of view. Then, the eyepiece optical system 105 is exchanged with the eyepiece optical system 104 for a large angle of view so as to suit a liking of the observer or the kind of an image to be observed, and further, the position of the display element 103 is moved so as to change the

observation angle of view, thereby observing an image displayed in the display element 103.

[0006]

[Problems to be solved by the Invention]

However, in the conventional constitution disclosed above with a variable observation angle of view of a displayed image, when the observation angle of view is to be changed, manual operations are required to exchange eyepiece optical systems or relay optical systems, or to drive a zoom lens with a switch, or the like, which results in a problematic operability.

[0007]

Also, in the observation optical device for overlapping a displayed image of a character or a picture with and external scenery to be observed, it is desired to change not only the size of the displayed image, but also the display position of the displayed image. However, such function is not provided in the conventional optical device mentioned above.

[0008]

An object of the present invention is to provide an observation optical device with an excellent operability which can freely change the size and the display position of an image displayed on a display

face when observing the image displayed on the display face as a virtual image, or, when observing the image displayed on the display face by spatially overlapping it with an external image, the size and the display position of the overlapped virtual image into a specific position in the screen according to a liking of the observer or to the external environment, by utilizing the visual line of the observer.

[0009]

[Means for solving the Problems]

An observation optical device of the present invention is characterized by the following arrangements.

(1-1) In an observation optical device having display means for displaying an image on a display face, an image observation optical system for forming a virtual image of the image in front of the observer, and visual line detecting means for detecting visual line information of the observer, the size and the position of a portion in which the image is displayed on the display face are controlled on the basis of the visual line information of the observer detected by the visual line detecting means.

[0010]

(1-2) Also, in an observation optical device having

display means for displaying an image on a display face, an image observation optical system for forming a virtual image of the image in an external scenery in front of the observer, and visual line detecting means for detecting visual line information of the observer, the size and the position of a portion in which the image is displayed on the display face are controlled on the basis of the visual line information of the observer detected by the visual line detecting means.

[0011]

(1-2-1) The observation optical device is particularly characterized in that a portion of the external scenery overlapped with the virtual image of the image is shielded by a shielding member.

(1-2-2) The observation optical device is also characterized by further comprising discrimination means for judging whether or not the visual line of the observer is fixed for a given period and substantially in a given direction.

[0012]

(1-3) The observation optical device is also characterized in that, when image information displayed on a display face of the display means is formed to be observed as a virtual image in front of the eye of the observer by the image observation optical system, a

displayed state of the image information displayed on the display face is controlled by control means on the basis of visual line information of the observer obtained by visual line detecting means provided in front of the eye of the observer.

[0013]

(1-3-1) The observer optical device is particularly characterized in that the displayed state of the image information indicates the size and/or the displayed position of the image information.

[0014]

(1-4) The observation optical device is also characterized in that, when image information displayed on a display face of display means is formed as a virtual image to spatially overlap with an external image in front of the eye of the observer by an observation optical system and the both images are observed in the same observing view, a displayed state of the image information displayed on the display face is controlled by control means on the basis of visual line information of the observer obtained by the visual line detecting means provided in front of the eye of the observer.

[0015]

(1-4-1) The observation optical device is

particularly characterized in that the control means causes a shielding member to shield a light beam from an external image corresponding to an area in which the virtual image of the image information displayed on the display face and the external image spatially overlap with each other so that the light beam does not enter the eye of the observer.

[0016]

[Embodiments]

Fig. 1 shows the optical paths respectively of the observation optical system in (A) and the visual line detecting system in (B) in the optical system according to an embodiment 1 of the present invention.

[0017]

Display means 4 displays, on a display face thereof, an image such as a character or a pattern, with visible light, a flat prism 10 is composed of two adhered prisms, of which junction plane is provided with a dichroic mirror transmitting the visible light and reflecting the infrared light for visual line detection. The prism 10 has a lateral wall 13.

[0018]

A first optical member 3A is provided with a flat face 5, a flat or aspherical face 1 partially utilizing total reflection, and a half-transmitting or mirror-

reflecting, spherical or aspherical convex face 2a. In the present embodiment, the face 2a is composed of a half mirror. A second optical member 3B is provided with a transparent or opaque, flat or curved face 6, and a concave face 2b, consisting of a half-transmitting or totally reflecting, spherical or aspherical surface same in shape as the convex face 2a. The face 2a of the first optical member 3A and the face 2b of the second optical member 3B are adhered to constitute a single prism block 3. The adhered face 2 constitutes a half mirror.

[0019]

There are also provided an imaging lens 8 for visual line detection, an image sensor 9 consisting of a CCD, and a light source 12 for detecting the visual line of the eye E of the observer, by illuminating the frontal part of said eye E with invisible (infrared) light.

[0020]

A visual line detecting circuit 14 detects the visual line information of the eye E. Discrimination means 15 discriminates whether the visual line of the observer is fixed for a predetermined time in a substantially same direction. Control means 16 receives image signals from an image information source

S and displays an image on the display face of the display means 4 under controlled display state based on the visual line information from the discrimination means 15.

[0021]

The prism 10 and the first optical member 3A constitute a part of the image observation optical system, and the image observation optical system and the second optical member 3B constitute a part of the observation optical system.

[0022]

In the following there will be explained, with reference to (A) of Fig. 1, the function of the observation optical system of the present embodiment. The control means 16 displays the image on the display face of the display means 4, based on the signals from the image information source S. The light beam (visible light beam) from the image displayed on the display means 4 is transmitted by the dichroic mirror 7 of the prism 10, then introduced into the prism block 3 through the face 5, totally reflected by the face 1, then reflected and condensed by the half mirror surface 2, and emerges from the face 1 to enter the pupil 0 of the observer. Thus a virtual image Y of the image displayed on the display means 4 is formed in front of

the observer, and can be observed by the observer.

[0023]

On the other hand, the light beam from the external scenery G is introduced into the face 6 of the prism block 3, then transmitted by the half mirror 2 and emerges from the face 1 to reach the pupil of the observer, who can thus observe the external scenery. Thus the observer observes, within a same viewing field, the virtual image Y of the image displayed on the display means 4 and the external scenery in superposition.

[0024]

In the following there will be explained the function of the visual line detecting optical system of the present embodiment. Referring to (B) of Fig. 1, the light reflected and scattered by the frontal part of the eye E of the observer, illuminated by the infrared light from the light source 12, is introduced into the face 1 of the prism block 3, then reflected by the half mirror 2 toward the face 1, then totally reflected by the face 1 and emerges from the face 5 to enter the prism 10. It is then reflected by the dichroic mirror 7, totally reflected by the lower face of the prism 10 and emerges from the face 13. It is then transmitted by the imaging lens 8 for visual line

detection, thereby forming an image of the frontal part of the eye on the image sensor 9. The light reflected by the cornea of the eye E forms Purkinje's images, while the light scattered by the pupil forms an image of the pupil. The visual line detecting circuit 14 calculates the direction of the visual line of the observer, based on the Purkinje's images and the pupil image obtained from the image sensor 9. This detection can be achieved for example by a method disclosed in the Japanese Patent Laid-Open Application No. 3-109029 of the present applicant.

[0025]

The light source 12, the first optical member 3A, the prism 10, the imaging lens 8, the image sensor 9 and the visual line detecting circuit 13 constitute a part of the visual line detecting means.

[0026]

Fig. 2 is a flow chart of the embodiment 1 of the present invention, for arbitrarily and selectively varying the size and position of the virtual image of the displayed image, to be superimposed with the external image, by the control means 16 of the present invention according to the visual line information of the eye E of the observer.

[0027]

Fig. 3 is a schematic view of display areas in the embodiment 1, i.e. size and position of the display, selectable in the image display on the display means 4. In this embodiment there are selectable five display areas 1 to 5, in which 1 to 4 respectively correspond to rectangular areas, each equal to 1/4 of the display face, while 5 corresponds to the full display face.

[0028]

In the following there will be explained the steps of the flow chart. The drawings at the right indicate the images provided to the observer at the respective steps.

[0029]

In the present embodiment, the direction of the visual line of the observer is constantly detected.

[0030]

Step 21: Turns on a switch for activating the function of the present invention. For this purpose, a switch mark is displayed, at a predetermined position within the display face, during the ordinary image observation, and, if the observer watches the virtual image of the switch mark for a predetermined time, the visual line detecting means and the discrimination means 15 detect such watching state and initiate a switching operation of the displayed image in the

following sequence:

(1) The visual line detecting means detects the direction watched by the observer.

[0031]

If the direction of the visual line coincides with the switch mark, the discrimination means 15 stores the direction of the visual line, as first visual line information, in a memory, and the sequence proceeds to (2).

[0032]

If the detected direction does not coincide with the switch mark, the discrimination means identifies that the observer does not wish to switch the displayed image, so that the sequence does not proceed to (2).

[0033]

(2) After the lapse of a predetermined time, the discrimination means 15 detects, by the visual line detecting means, the direction watched by the observer.

[0034]

If the detected direction coincides with the switch mark, the discrimination means 15 judges that the observer has watched the switch mark for the predetermined time, and sends a signal to the control means 16 to turn on the switch. Then the sequence proceeds to a step 22.

[0035]

On the other hand, if the detected direction does not coincide with the switch mark, the sequence returns to (1).

[0036]

By repeating the above-explained steps, the switching operation for the displayed image is securely started when the observer watches the switch mark for the predetermined time.

[0037]

Step 22: When the switch is turned on, the control means 16 displays, for example, five points shown in Fig. 9, on the display face of the display means 4. Thus the observer sees an image 22a in Fig. 2.

[0038]

Step 23: Determines the display area. The observer watches a point, representing the desired display area, for a predetermined time, and the visual line detecting means and the discrimination means 15 identifies the point watched by the observer for the predetermined time, within the image 22a, in the following sequence:

(1) The visual line detecting means detects the direction watched by the observer, and the

discrimination means 15 identifies whether the detected direction coincides with any of the five points. If the detected direction coincides with any of the points, the detected direction is stored, as first visual line information, in a memory.

[0039]

If the detected direction does not coincide with any of the points, the detection of the visual line is continued until the visual line is detected to any of the points.

[0040]

(2) After the lapse of a predetermined time, the discrimination means 15 detects, by the visual line detecting means, the direction watched by the observer, and obtains second visual line information.

[0041]

(3) The discrimination means 15 compares the detected direction of visual line with that corresponding to the point stored in the memory.

[0042]

If two directions mutually coincide, the discrimination means judges that the point corresponding to the detected direction is the point desired by the observer for image display and sends the corresponding information to the control means 16, and

the sequence proceeds to a step 24.

[0045]

If the two directions do not mutually coincide, the sequence returns to (1).

[0044]

The point watched by the observer is determined by repeating the above-explained steps.

[0043]

In this manner, when the observer watches a point for a predetermined time, a display area is uniquely determined corresponding to said point.

[0046]

Step 24: The control means 16 displays an image in the display area determined in the step 23, by varying the size and position of the display of the image, by applying suitable image processing to the image information. For example, if the point 5 shown in Fig. 3 is selected, the image is displayed in full size of the display face. If the point 4 is selected, the image size is changed to 1/4 of the display face and is displayed at the lower right part thereof, as shown in 24a. However the switch mark is separately displayed anew.

[0047]

The switching of the displayed image is thus

completed.

[0048]

In the present embodiment, as explained in the foregoing, the size and position of the virtual image of the displayed image to be superimposed can be varied, in the course of image observation and according to the situation of the external image, by merely directing the visual line of the observer to a specified position within the viewing field, without any manual operation, so that there is attained extremely satisfactory operability. Besides, in the present embodiment, the entire device can be compactized by partial common use of the image observation optical system for observing the displayed image and the visual line detecting optical system for visual line detection.

[0049]

In the foregoing embodiment the display area can be selected in five manners, but it is also possible to further increase the freedom of selection available to the observer.

[0050]

Also the switch turn-on operation may be conducted manually.

[0051]

Fig. 5 shows schematic views of optical paths, in which an observation optical system according to an embodiment 2 is shown in (A) and a visual line detecting optical system in (B), wherein components same as those in the embodiment 1 in Fig. 1 are represented by same numbers.

[0052]

The present embodiment is different from the embodiment 1 in that a transmissive liquid crystal device (shield member) 11 is provided outside the face 6 of the second optical member in order to intercept the light beam, or a part thereof, entering the prism block 3 from the outside. Such interception of the incoming light eliminates the overlapping of the external image with the virtual image Y of the displayed image, thereby enabling clear observation of the latter.

[0053]

The prism 10, the first optical member 3A etc. constitute a part of the image observation optical system, while the image observation optical system, the second optical member 3B and the liquid crystal device 11 constitute a part of the observation optical system. Also the light source 12, the first optical member 3A, the prism 10, the imaging lens 8, the image sensor 9

and the visual line detecting circuit 14 constitute a part of the visual line detecting means.

[0054]

The function of displayed image observation by the image observation optical system and that of the visual line detecting optical system in the present embodiment are same as that in the embodiment 1.

[0055]

In the following there will be explained the control sequence of the present embodiment, with reference to a flow chart shown in Fig. 6. The drawings at the right-hand side of the flow chart schematically illustrate the images provided to the observer in the respective steps.

[0056]

In the present embodiment, the direction of visual line of the observer is constantly detected.

[0057]

Step 61: Turns on a switch for activating the function of the present invention. As in the embodiment 1, when the observer watches, for a predetermined time, a virtual image of a switch mark displayed as a spot in a part of the displayed image, superimposed with the external image, the visual line detecting means and the discrimination means 15 detect

such watching state and initiate a switching operation of the displayed image.

[0058]

Step 62: Enters the display size information of the displayed image. The control means 16 displays, for example, a virtual image of a displayed image 62a, for observation by the observer. Said image includes, for example, a full-sized rectangular display frame S1, a rectangular frame S2 which is 1/2 in size in the vertical and horizontal directions, and a rectangular frame S3 which is 1/4 in size.

[0059]

Each display frame has a watching mark at a corner (upper right corner in the illustrated example). When the observer watches, for a predetermined time, the watching mark belonging to a desired frame, the visual line detecting means and the discrimination means 15 detect such watching state and judge that the observer has selected the corresponding display size, whereupon the display size is determined and the corresponding information is supplied to the control means 16. (The sequence for this operation is similar to that already explained in the step 23 of the embodiment 1.) Such selecting procedure from a limited number of display frames enables rapid setting of the display size,

though fine adjustment of the display size is not possible. As an example, let us consider a case of selecting the frame S2.

[0060]

Step 63: Enters the display position information of the displayed image. The control means 16 displays, for example, a virtual image of a displayed image 63a, in which the full-sized display face is divided into grating-patterned areas of a suitable number, in superposition with the external image. Then the observer watches, for a predetermined time, a desired image display position (for example marked with "x") in these areas. In response, the visual line detecting means and the discrimination means 15 determine the display position in the following sequence:

(1) The visual line detecting means detects the position watched by the observer in the grating pattern, and the discrimination means 15 stores the detected area number, as first visual line information, in a memory.

[0061]

(2) After the lapse of a predetermined time, the discrimination means 15 detects, by the visual line detecting means, the position watched by the observer in the grating pattern, and the detected area number is

taken as second visual line information.

[0062]

(3) the discrimination means 15 compares thus detected area number with that stored in the memory.

[0063]

If the two area numbers mutually coincide, the discrimination means 15 judges this area as the image display area desired by the observer, and sends the corresponding information to the control means 16. Then the sequence proceeds to a step 64.

[0064]

If the two area numbers do not coincide each other, the memorized area number is replaced by the newly detected area number, and the sequence returns to (2).

[0065]

The display position desired by the observer is determined by repeating the above-explained steps. This procedure enables secure entry of the position information and avoids erroneous input, even if the visual line of the observer is somewhat shifted, as long as the observer watches the vicinity of the desired area for a predetermined time during the input state of the position information.

[0066]

Step 64: The control means 16 discriminates whether the image of the designated size can be displayed around the display position designated by the observer.

[0067]

If such display is possible, the display area is thus determined and the sequence proceeds to a step 65.

[0068]

On the other hand, if the displayed image P1 around the designated position overflow the display face as indicated in 64a, the sequence proceeds to a step 66.

[0069]

Step 66: Effects calculation for shifting the display position of the displayed image P1, for determining a display area P2, allowing to retain the designated size of the image P1 with a minimum shift of the display position.

[0070]

Step 65: The control means 16 shifts the transmittance of the liquid crystal device 11 to zero in the image overlapping portion as indicated in 65a, thereby shielding the external image in said portion and avoiding the interference of the external image with the virtual image of thus determined display

image.

[0071]

Step 67: The control means 16 displays the image in the display area determined in the steps 64 and 66, by varying the size and position of display of the image by applying suitable image processing to the image information. The switch mark is displayed separately from the overlapping area.

[0072]

The switching of the displayed image is thus completed.

[0073]

In the present embodiment, as explained in the foregoing, the size and position of the virtual image of the displayed image to be superimposed can be varied, in the course of image observation and according to the situation of the external image, by merely directing the visual line of the observer to a specified position within the viewing field, and the external image in the superimposed portion is suitably shielded by a shield member. Thus there is attained an observation optical device, featured by extremely satisfactory operability, not requiring any manual operation for varying the displayed image, and allowing clear observation of the virtual image Y of the

displayed image.

[0074]

The display size may also be entered for example by displaying a linear pattern, of which an end corresponds to the full-sized image frame while the other end corresponds to the 1/4-sized image frame, and judging the display size desired by the observer in analog manner, based on the position watched by the observer on the linear pattern. In this manner the observer can enter, in considerably precise manner, the proportion of display size with respect to the maximum display size.

[0075]

In the present embodiment, a grating pattern is displayed at the entry of the display position, but such grating pattern display may be dispensed with.

[0076]

[Effect of the Invention]

Based on the above-explained configuration, the present invention provides an observation optical device of excellent operability capable of arbitrarily varying the size and position of display of the virtual image for observation of the image displayed on the display face, in the course of observation of such virtual image or of observation of such virtual image

spatially overlapped with the external image, to specified positions within the viewing field, according to the wish of the observer or to the external situation, utilizing the visual line of the observer.

[0077]

Furthermore there is provided an observation optical device capable of shielding a part of the external image where the virtual image of the displayed image is overlapped, thereby enabling extremely clear observation of such virtual image.

[Brief Description of the Drawings]

[Fig. 1]

Schematic view (A) and (B) showing essential portions of an observation optical system and a visual axis detecting optical system, respectively, according to the embodiment 1 of the present invention.

[Fig. 2]

A flow chart showing the control sequence of the embodiment 1 of the present invention.

[Fig. 3]

A schematic view showing selectable display areas in the embodiment 1 of the present invention.

[Fig. 4]

A schematic view showing points for display area selection in the embodiment 1 of the present invention.

[Fig. 5]

Schematic views (A) and (B) showing essential portions of an observation optical system and a visual axis detecting optical system, respectively, according to the embodiment 2 of the present invention.

[Fig. 6]

A flow chart showing the control sequence of the embodiment 2 of the present invention.

[Fig. 7]

A view showing a conventional device.

[Description of Reference Numerals or Symbols]

0... Pupil of the observer

1... Face

2... Half mirror face (spherical face)

3... Prism block

3A... First optical member

3B... Second optical member

4... Display means

5... Flat face

6... Face

7... Dichroic mirror

8... Imaging lens for visual line detection

9... Image sensor

10... Prism

11... Liquid crystal device

12... Light source

13... Wall

14... Visual line detecting circuit

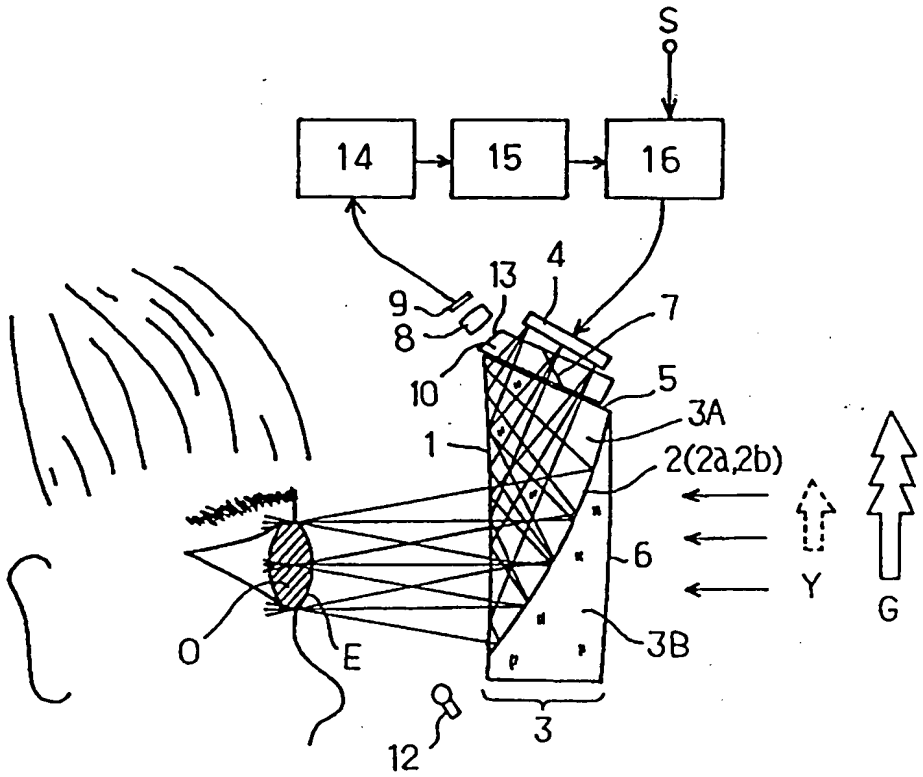
15... Discrimination means

16... Control means

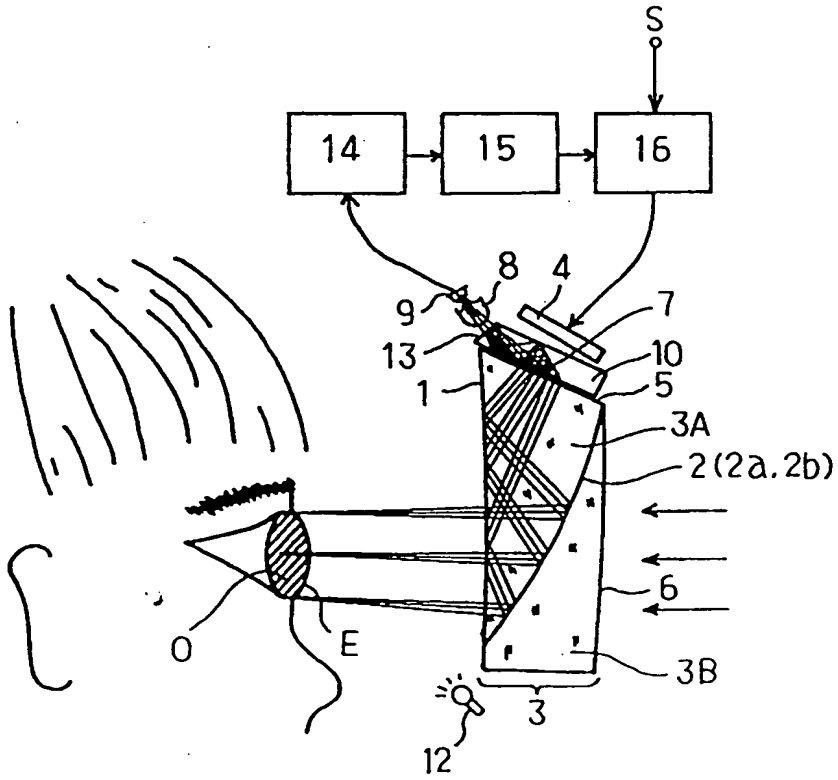
【書類名】　図面　[Name of the Document] Drawing

【図１】 Fig. 1

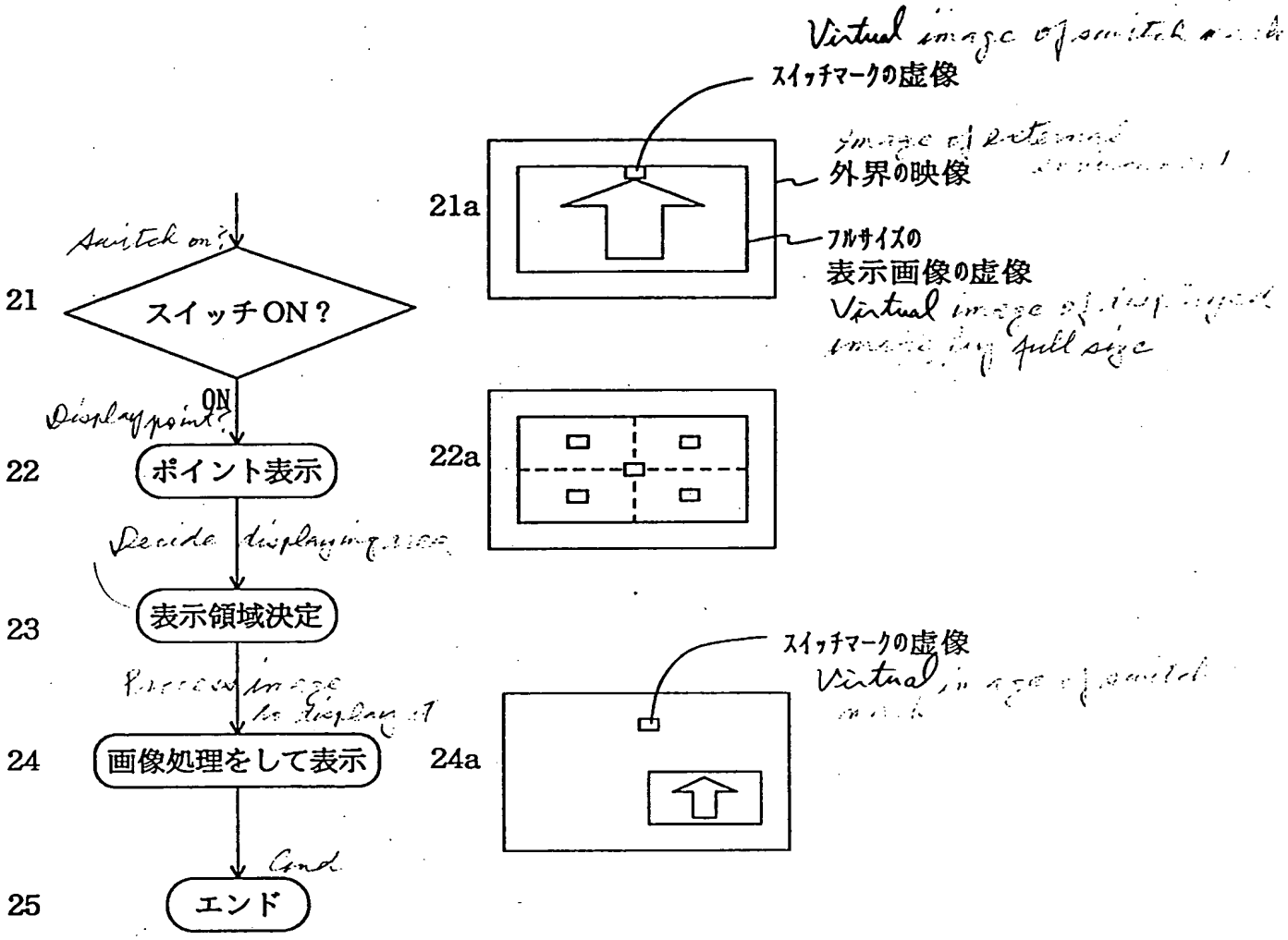
(A)



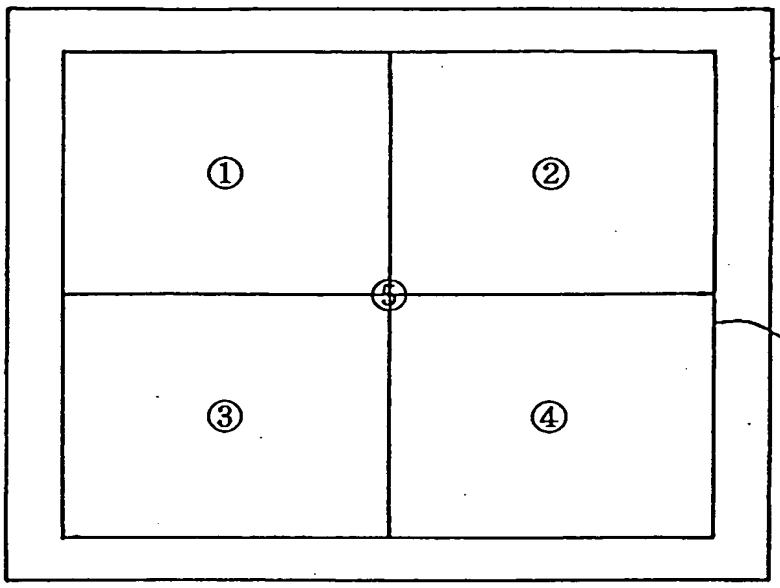
(B)



【図２】 Fig.2


Virtual image of switch mark
スイッチマークの虚像
image of external world
外界の映像
21a
フルサイズの
表示画像の虚像
Virtual image of display image in full size
Switch on?
21
スイッチON？
ON
Display point?
22
ポイント表示
22a
Decide displaying area
23
表示領域決定
Process image to display it
24
画像処理をして表示
24a
スイッチマークの虚像
Virtual image of switch mark
End
25
エンド

【図３】 Fig. 3

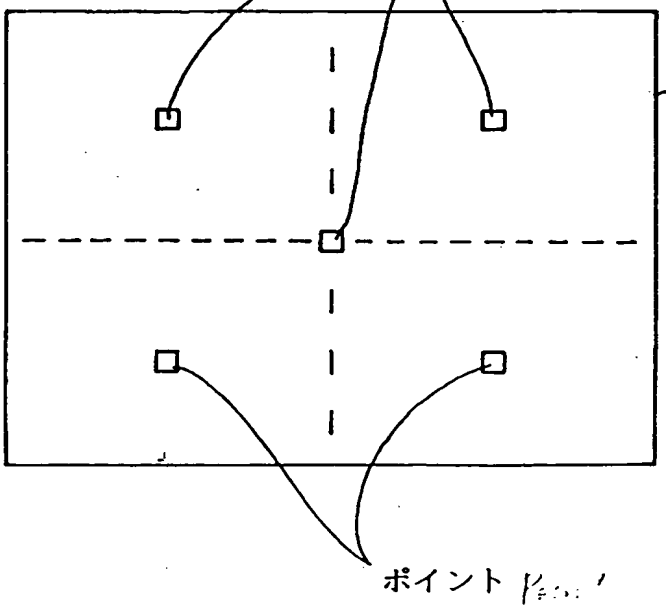


外界の映像

フルサイズの
表示面の虚像

⑤はフルサイズ

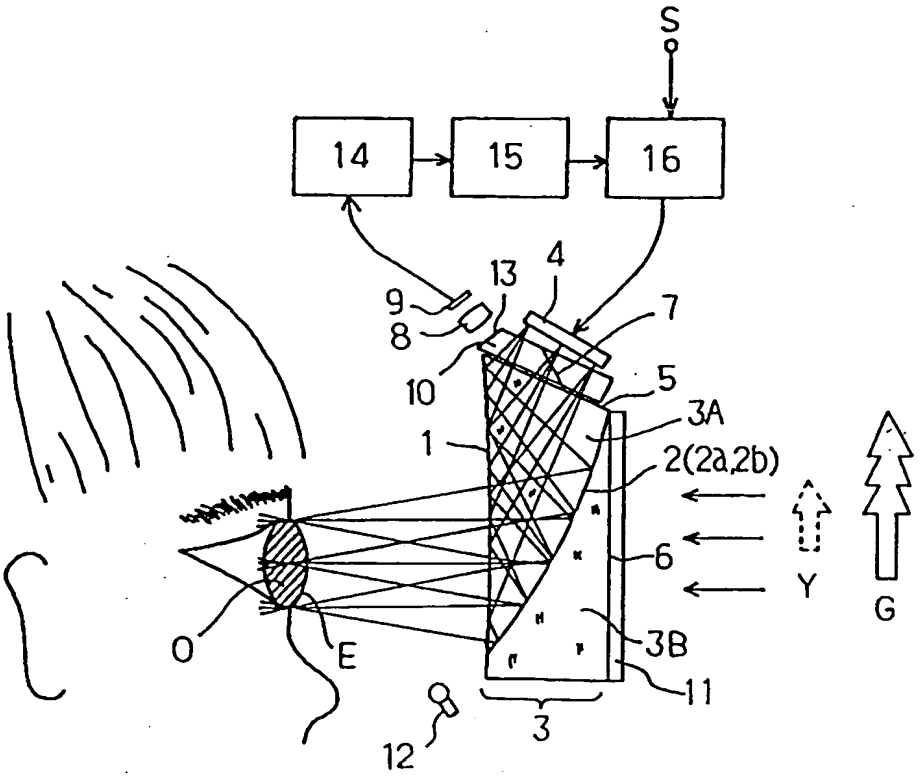
【図４】 Fig. 4



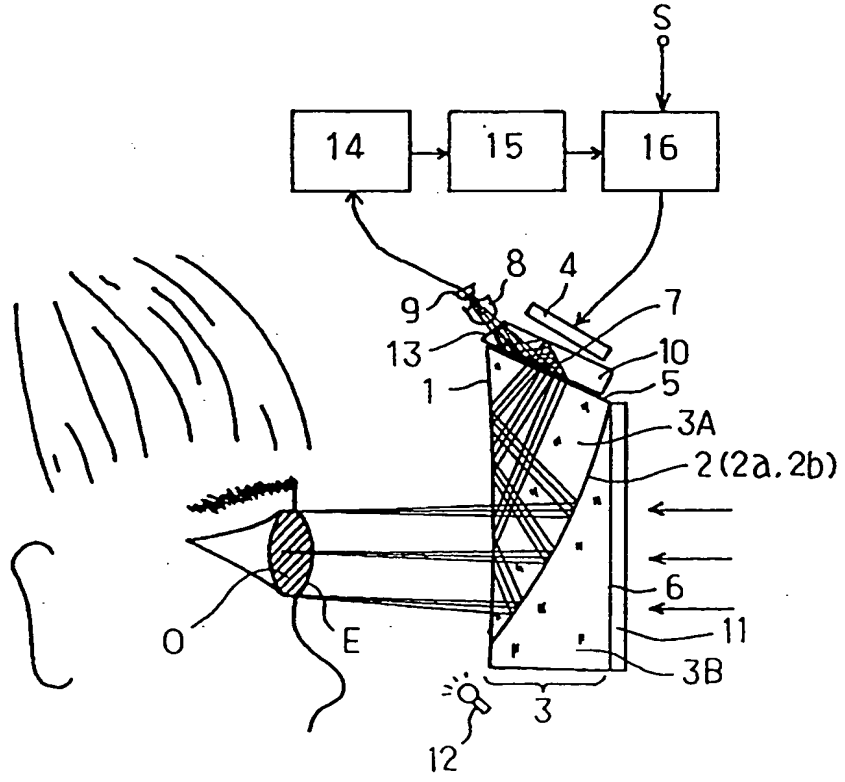
フルサイズの
表示面

【図５】 Fig.5

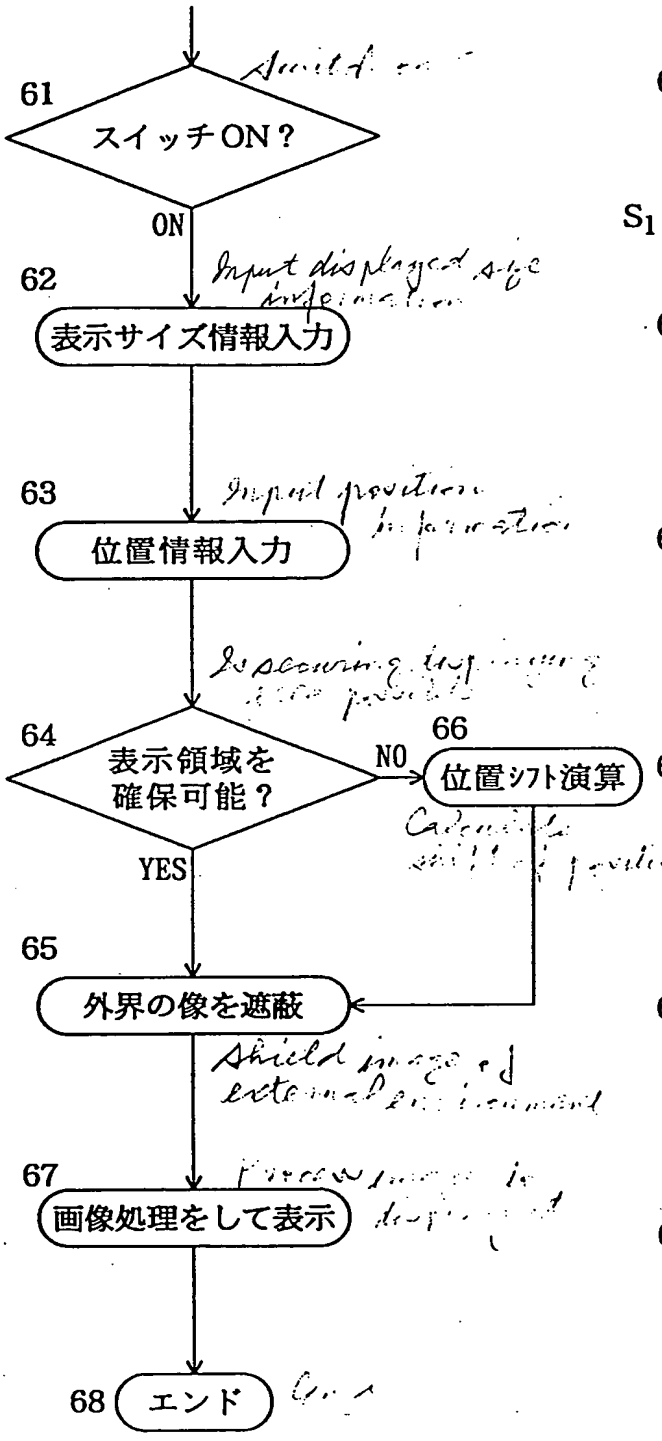
(A)

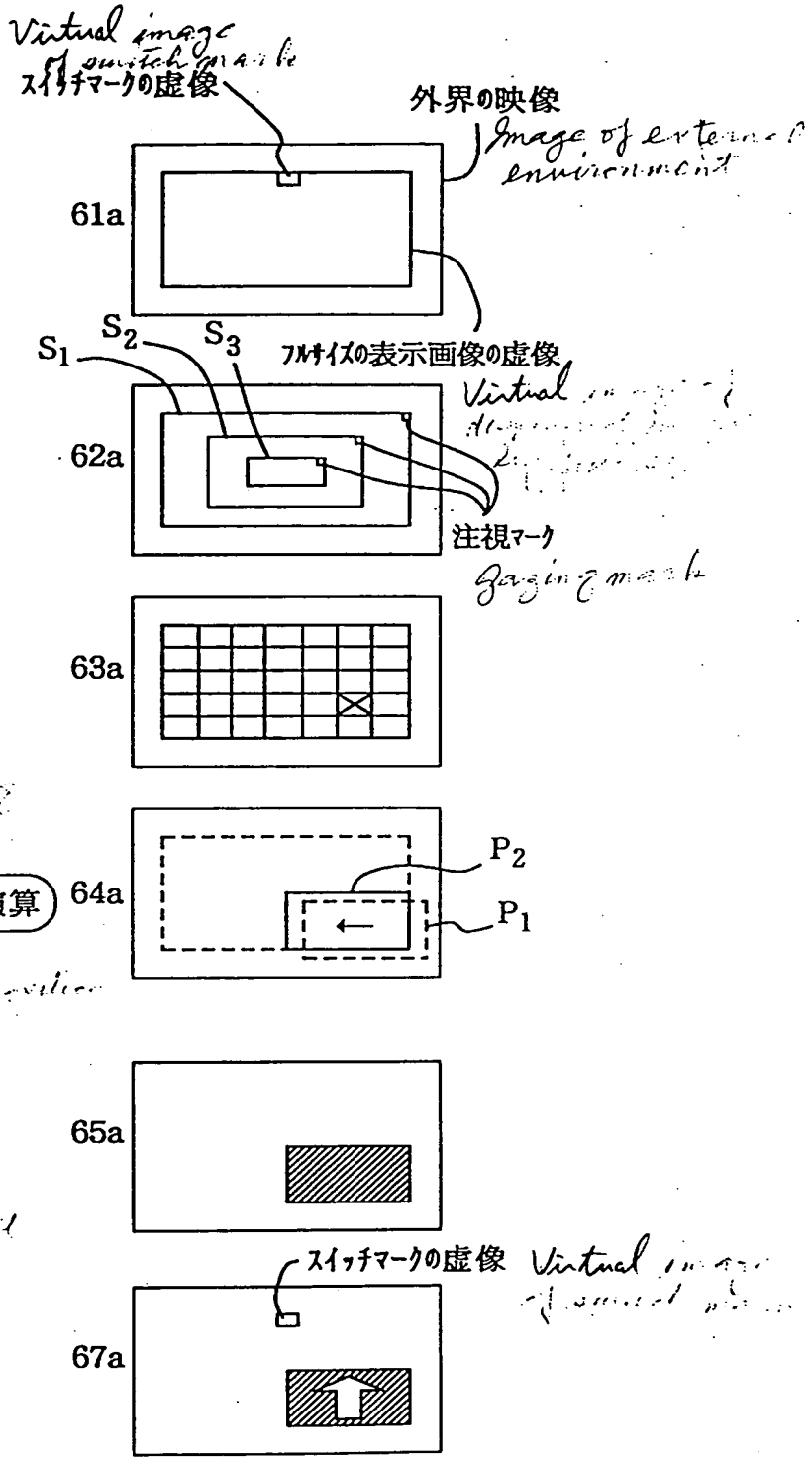

S
14
15
16
13
4
9
8
7
10
5
3A
1
2(2a,2b)
6
Y
G
O
E
3B
11
3
12

(B)

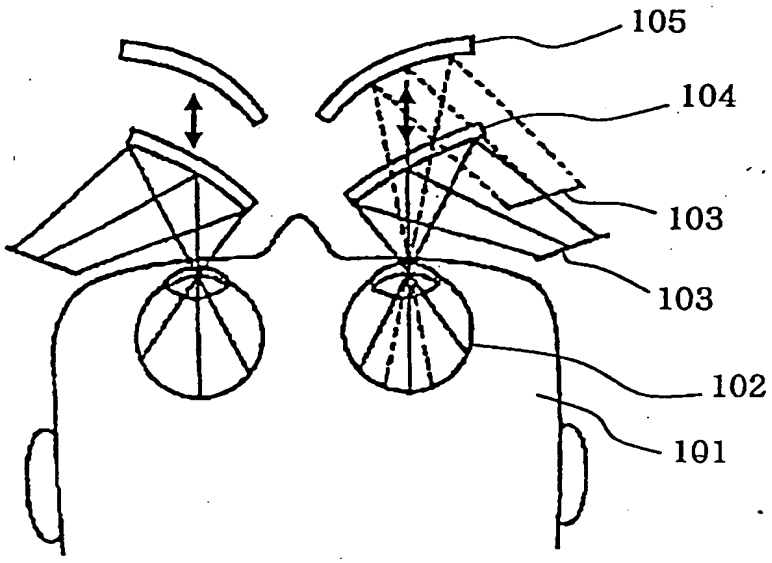

S
14
15
16
8
4
9
7
13
10
1
5
3A
2(2a.2b)
6
11
O
E
3B
3
12

【図６】 Fig. 6


61
スイッチON？
ON
62
表示サイズ情報入力
63
位置情報入力
64
表示領域を確保可能？
NO
66
位置シフト演算
YES
65
外界の像を遮蔽
67
画像処理をして表示
68
エンド


スイッチマークの虚像
外界の映像
61a
S1
S2
S3
フルサイズの表示画像の虚像
62a
注視マーク
63a
64a
P2
P1
65a
スイッチマークの虚像
67a

【図７】 Fig 7



[Name of the Document] Abstract

[Abstract]

[Object] An object of the present invention is to attain an observation optical device with an excellent operability which can freely change the size and the display position of a displayed image during observing the displayed image, or, when observing the displayed image by overlapping it with an external image, the size and the display position of an overlapped virtual image of the displayed image according to a linking of the observer or to the external environment, only by directing the visual line of the observer into a specific position in the screen.

[Constitution] There is disclosed an observation optical device having display means for displaying an image on a display face, an image observation optical system for forming a virtual image of the image in front of the observer, and visual line detecting means for detecting visual line information of the observer, in which the observer selectively gives information with his visual line so as to control the size and the position of a portion in which the image on the display face is displayed by use of the visual line information detected by the visual line detecting means.

[Elected Drawing] Fig. 1